Topic: Power rule

Question: Find the derivative.

$$y = -3x^3$$

Answer choices:

A $y' = -9x^4$

B $y' = 9x^2$

C $y' = -9x^2$

D $y' = -6x^2$

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Solution: C

$$y' = \frac{d}{dx}\left(-3x^3\right)$$

$$y' = -3\frac{d}{dx}\left(x^3\right)$$

$$y' = -3\left(3x^{3-1}\right)$$

$$y' = -9x^2$$

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Topic: Power rule

Question: Find the derivative.

$$y = 5x^5 - 4x^2$$

Answer choices:

A $y' = 5x^4 - 4x$

B $y' = 25x^4 - 8x$

C $y' = 25x^5 - 8x^2$

D $y' = 25x^3 - 8$

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Solution: B

For the function

$$y = 5x^5 - 4x^2$$

the derivative, using power rule, is

$$y' = 5(5)x^{5-1} - 4(2)x^{2-1}$$

$$y' = 25x^4 - 8x^1$$

$$y' = 25x^4 - 8x$$

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Topic: Power rule

Question: Find the derivative.

$$y = 3x^7 - 9x^2 + 21$$

Answer choices:

A $y' = 21x^{-6} - 18x$

B $y' = 3x\left(7x^5 - 6x\right)$

C $y' = 21x^8 - 18x^2$

D $y' = 21x^6 - 18x$

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Solution: D

Because this is a polynomial, we can take the derivative of each term separately.

$$y' = \frac{d}{dx}\left(3x^7\right) - \frac{d}{dx}\left(9x^2\right) + \frac{d}{dx}(21)$$

Pull out the constants.

$$y' = 3\frac{d}{dx}\left(x^7\right) - 9\frac{d}{dx}\left(x^2\right) + \frac{d}{dx}(21)$$

Apply the power rule.

$$y' = 3\left(7x^{7-1}\right) - 9\left(2x^{2-1}\right) + 0$$

$$y' = 21x^6 - 18x$$

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